

AMENDMENTS TO THE SPECIFICATION:

Please insert the following paragraph prior to the paragraph beginning on page 7, line 29.

In other aspects, the present invention relates to a photolytic apparatus for oxygenating and removing carbon dioxide and hydrogen gas in order to maintain a proper physiological environment comprising: a photolytic cell having an anode compartment and a cathode compartment, a) said anode compartment having an inlet for receiving an aqueous solution, an anode conductor, a photo-reactive surface, and an outlet for transporting a dissolved oxygenated solution out of said anode compartment, wherein said photo-reactive surface has the ability, upon photo-activation, to convert water in an aqueous solution to dissolved oxygen, hydrogen ions and electrons upon light activation; b) said cathode compartment having an inlet for receiving carbon dioxide, C₅ pentose, and a catalyst, a cathode conductor for converting hydrogen ions, carbon dioxide, C₅ pentose and catalyst to C₆ hexose, and an outlet for removing the C₆ hexose from the cell and any remaining reactants, wherein said cathode conductor is connected to said anode conductor; and a light source for providing light photons to said photo-reactive surface to initiate a series of chemical reactions that results in dissolved oxygen generation in the anode compartment and C₆ hexose formation in the cathode compartment; wherein said photo-reactive surface further comprises a disproportionation catalyst including at least one of Fe^{II}, Fe^{III}, Cu^I, Cu^{II}, Co^I, Co^{II}, Mn^{II}, Mn^{III}, Mn^{IV}, and MnO₂; wherein said cell is constructed of self-assembled monolayers on mesoporous supports.